REMARKS

Claims 1-11 are pending in the application and are presented for reconsideration. The remaining independent claims are claims 1 and 11.

The amendments to the figures and the specification are believed not to introduce new matter, and their entry is respectfully requested. Based on the above Amendment and the following Remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections, and withdraw them.

Objections to the Drawings

The Examiner has objected to Figures 1 and 3. The drawings have been amended to expressly label Figure 1 as Prior Art. No admission as to the scope of prior art is made thereby. In addition, Figure 3 has been changed to include labels identifying the path when the query in steps S8 and S12 is "Yes" and "No" as requested by the Examiner.

Approval of the Proposed Drawing Changes is respectfully requested. It is also respectfully requested that the Examiner explicitly indicate his approval thereof in the next official communication.

Rejections under 35 U.S.C. §101

The Examiner has objected to and rejected claim 11 under 35 U.S.C §101 as being directed toward non-statutory subject matter. Applicants disagree.

Section 2106 of the Manual of Patent Examination Procedures (MPEP) states that "functional descriptive material" is directed toward non-statutory subject matter and then states that functional descriptive material includes "computer programs which impart functionality when employed as a computer component." MPEP §2106 (p. 2100-11). However, the MPEP continues in the following paragraph to state that: "[w]hen function descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. (emphasis added)" MPEP §2106 (p. 2100-12). Claim 11 recites, in part: "A computer program stored in a computer readable medium...(emphasis added)" Accordingly, according to the MPEP, claim 11 recites statutory subject matter.

With respect to the objection of claim 11 because of the reference to claim 1 and the request that the reference to "claim 1" be "replaced by the actual items of claim 1" Applicants submit that the form of claim 11 is proper. The Federal Circuit has passed judgment of this type of claim and held that it is recites patentable subject matter. In In re Wamerdam 35 USPQ2d 1754 (Fed. Cir. 1994), the Court of Appeals for the Federal Circuit (CAFC) analyzed a claim (claim 5) that recited:

5. A machine having a memory which contains data representing a bubble hierchacy generated by the method of any of Claims 1 through 4.

In analyzing the claims the CAFC held that "Claim 5 is for a machine and is clearly patentable subject matter." Wamerdam at 1759.

Accordingly, Applicants submit that Federal Circuit precedent and the patent office examination guidelines both support the finding that claim 11 recites statutory subject matter. Applicants respectfully request that the Examiner reconsider and withdraw the objection to claim 11 and the rejection of claim 11 under 35 USC §101.

Rejections under 35 U.S.C. §102

The Examiner has rejected claims 1-11 as allegedly being unpatentable over U.S. Patent No. 5,148,513 to Koza et al. (hereafter referred to as "Koza").

Based on the following Remarks, Applicants respectfully request that the Examiner reconsider the rejection, and withdraw it.

In the rejection the Examiner states that "As per claim 1, Koza discloses setting up the initial population as parents (abstract and figure 3A), reproducing the parents to create a plurality [of] offsprings (abstract and figure 3A), evaluating the quality of the offsprings by a means of

fitness function (abstract and figure 3A) and selecting at least one [offspring] having the hightest evaluating quality value as parents."

Claim 1 recites:

> 1. A method for evolutionary optimization, comprising the following steps:
> setting up an initial population as parents,
> reproducing the parents to create a plurality of offsprings,
> evaluating the quality of the offsprings by means of a fitness function, said fitness function is one of an original fitness function and an approximate fitness function, and
> selecting at least one offspring having the highest evaluated quality value as parents, characterized in that the frequency of the use of the original fitness function is adaptable during the optimization process.

In a rejection under 35 U.S.C. §102, each and every claim element must be present in the applied reference. However, the Examiner has failed to point out any prior art teaching which anticipates the explicit recitation in the language of claim 1 of either the step of "evaluating the quality of the offsprings by means of a fitness function, said fitness function is one of an original fitness function and an approximate fitness function," or the step of "selecting at least one offspring having the highest evaluated quality value as parents, characterized in that the frequency of the use of the original fitness function is adaptable during the optimization process." Therefore, it is respectfully submitted that the rejection is improper and should be withdrawn.

The present invention relates to an evolutionary optimization algorithm having the step of setting up an initial population as parents, reproducing the parents to create a plurality of offsprings, evaluating the quality of the offsprings to a means of a fitness function and selecting the offsprings having the highest evaluated quality value as parents for the next cycle of the evolutionary optimization algorithm.

The claimed invention relates and recites an evolutionary optimization method in which, selectively, an original fitness function or an approximate fitness function (which is computationally less complex) can be used. As recited in claim 1, the frequency of the use of the original fitness function in relation to the approximate fitness function is adaptable during the optimization process, i.e., during the sequence of several cycles of the above captioned evolutionary optimization the percentage as to how often the original function is used in relation to the approximate fitness function is used is adaptable during the optimization process.

In contrast, Koza fails to teach the use of an original fitness function and an approximate fitness function. In fact the in the official action the Examiner does not contend that Koza teaches the use of both of these functions. An in fact, Koza only teaches the use of a regular fitness function to assign a fitness value to each result (Koza, col. 23, lines 55-60).

Koza is silent about the use of an approximate fitness function and is also silent as to adapting the ratio of the use of the original fitness function and the approximate fitness function during the optimization.

As claims 2-10 are is dependent on claim 1 and claim 11 incorporates the steps of claim 1, all arguments advanced above with respect to claim 1 are hereby incorporated so as to apply to claims 2-11.

Since Koza does not teach or suggest every claim element, Applicants submit that rejection of claims 1-11 is incorrect and respectfully request that the Examiner reconsider and withdraw the rejection of claims 1-11.

Conclusion

Applicants believe that all of the stated grounds of objection and rejection set forth by the Examiner in the Office Action have been properly accommodated or addressed. Applicants, therefore, respectfully request that the Examiner reconsider all presently outstanding objections and rejections and withdraw them. The Examiner is invited to telephone the undersigned representative if it is felt that an interview might be useful for any reason.

Respectfully submitted
Yaochu Jin et al.

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By: _____

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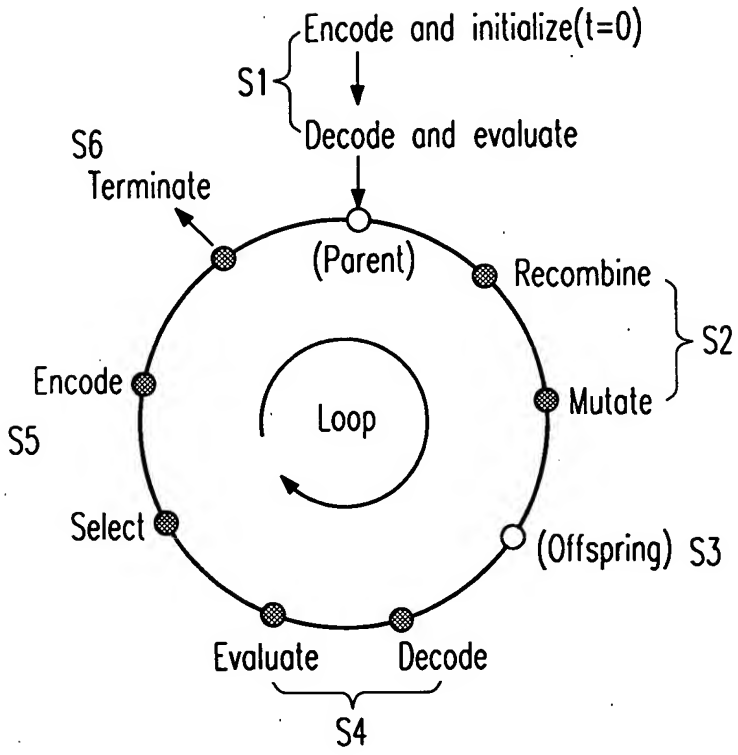
23077/06445/DOCS/1448871.1

Annotated Marked-Up Drawings
Application No.: 10/007,734
Title: APPROXIMATE FITNESS FUNCTIONS
Inventor(s): Yaochu Jim *et al.*
Atty. Docket No.: 23077-06445



Algorithm

t:=0;
encode and initialize P(0)
decode and evaluate P(0)
do
  recombine P(t)
  mutate P(t)
  decode P(t)
  evaluate P(t)
  P(t+1) = select (P(t)
  encode P(t+1)
  t:=t+1
until terminate

Fig. 1

PRIOR ART

Annotated Marked-Up Drawings
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Title: APPROXIMATE FITNESS FUNCTIONS
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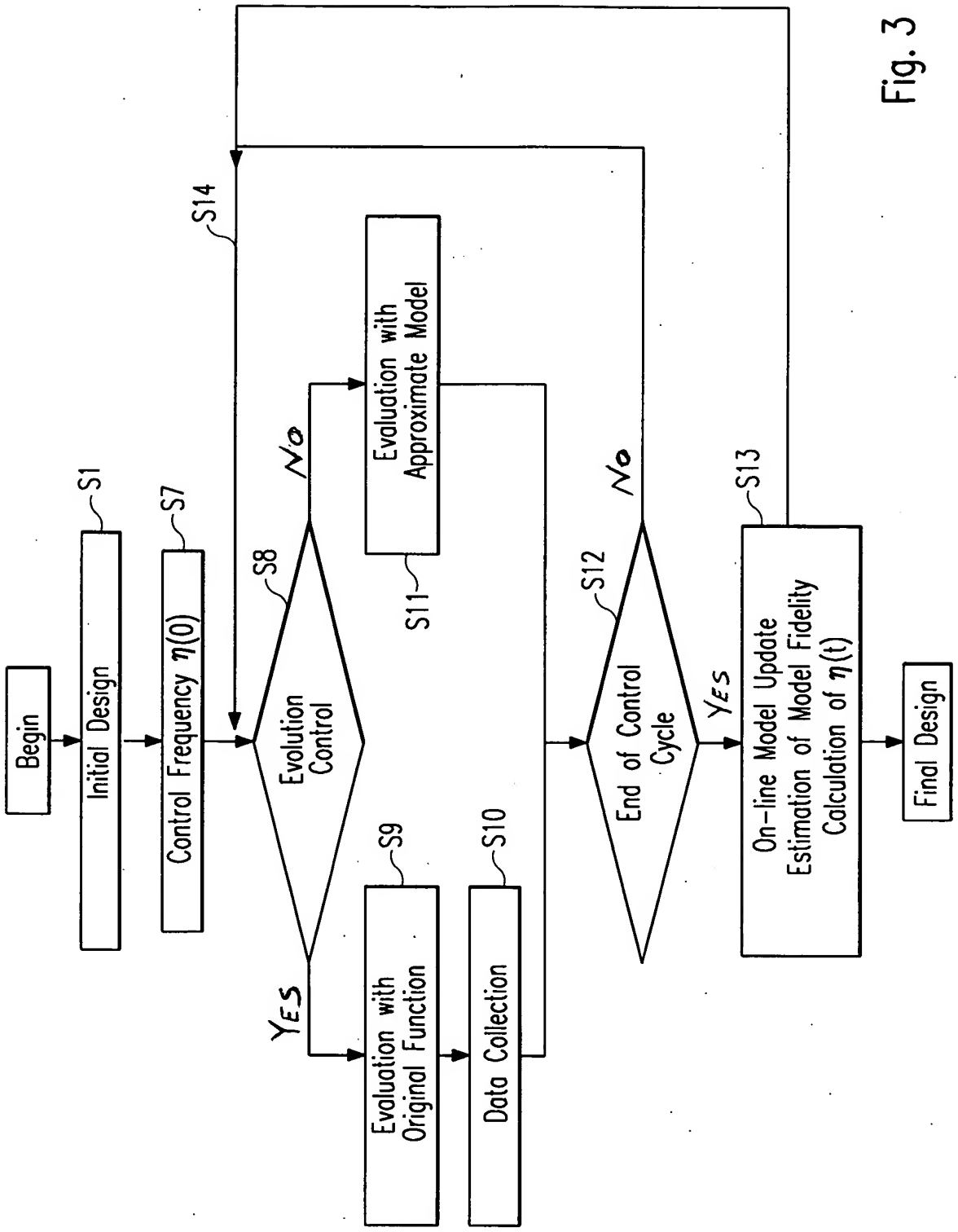

Fig. 3